

Title (en)  
METHOD FOR PRODUCING A HIGH STRENGTH STEEL SHEET HAVING IMPROVED STRENGTH AND FORMABILITY AND OBTAINED SHEET

Title (de)  
VERFAHREN ZUR HERSTELLUNG EINES HOCHFESTEN STAHLBLECHS MIT VERBESSERTER FESTIGKEIT UND UMFORMBARKEIT UND DAS HERGESTELLTE BLECH

Title (fr)  
PROCÉDÉ DE PRODUCTION D'UNE TÔLE D'ACIER À HAUTE RÉSISTANCE PRÉSENTANT RÉSISTANCE ET FORMABILITÉ AMÉLIORÉES ET TÔLE OBTENUE

Publication  
**EP 3164518 B1 20200408 (EN)**

Application  
**EP 15750810 A 20150703**

Priority  
• IB 2014002296 W 20140703  
• IB 2015055037 W 20150703

Abstract (en)  
[origin: WO2016001706A1] A method for producing a high strength steel sheet having a yield strength  $YS \geq 850$  MPa, a tensile strength  $TS \geq 1180$  MPa, a total elongation  $\geq 13$  % and a hole expansion ratio  $HER > 30\%$ , by heat treating a steel sheet wherein the chemical composition of the steel contains:  $0.13\% \leq C \leq 0.22\%$ ,  $1.2\% \leq Si \leq 1.8\%$ ,  $1.8\% \leq Mn \leq 2.2\%$ ,  $0.10\% \leq Mo \leq 0.20\%$ ,  $Nb \leq 0.05$  %,  $Ti \leq 0.05$  %,  $Al \leq 0.5\%$ , the remainder being Fe and unavoidable impurities. The sheet is annealed at an annealing temperature  $TA \geq 865$  °C and  $\leq 1000$  °C for a time of more than 30 s then quenched by cooling it to a quenching temperature  $QT$  between  $275^{\circ}C$  and  $375^{\circ}C$ , a cooling speed  $\geq 30$  °C/s in order to have, just after quenching, a structure consisting of austenite and at least 50% of martensite, the austenite content being such that the final structure can contain between 3% and 15% of residual austenite and between 85 % and 97% of the sum of martensite and bainite without ferrite, then heated to a partitioning temperature  $PT$  between  $370$  °C and  $470^{\circ}C$  and maintained at this temperature for a time  $Pt$  between 50 s and 150 s, then cooled to the room temperature. Obtained sheet.

IPC 8 full level  
**C21D 1/19** (2006.01); **C21D 6/00** (2006.01); **C21D 8/04** (2006.01); **C21D 9/48** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/12** (2006.01); **C22C 38/14** (2006.01)

CPC (source: CN EP KR RU US)  
**C21D 1/18** (2013.01 - US); **C21D 1/19** (2013.01 - EP US); **C21D 1/20** (2013.01 - CN KR); **C21D 6/005** (2013.01 - US); **C21D 6/008** (2013.01 - US); **C21D 8/0226** (2013.01 - CN); **C21D 8/0236** (2013.01 - CN); **C21D 8/0242** (2013.01 - RU); **C21D 8/0247** (2013.01 - CN KR); **C21D 8/0447** (2013.01 - EP US); **C21D 9/46** (2013.01 - CN KR RU US); **C21D 9/48** (2013.01 - EP US); **C22C 38/02** (2013.01 - CN EP KR RU US); **C22C 38/04** (2013.01 - CN EP KR RU US); **C22C 38/06** (2013.01 - CN EP KR RU US); **C22C 38/12** (2013.01 - CN EP KR RU US); **C22C 38/14** (2013.01 - CN EP KR RU US); **C21D 8/0426** (2013.01 - EP US); **C21D 8/0436** (2013.01 - EP US); **C21D 2211/001** (2013.01 - CN EP KR US); **C21D 2211/002** (2013.01 - CN EP KR US); **C21D 2211/008** (2013.01 - CN EP KR US)

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EP3901313A4; EP3901314A4

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)  
**WO 2016001706 A1 20160107**; BR 112016030065 A2 20170822; BR 112016030065 B1 20210223; CA 2954145 A1 20160107; CA 2954145 C 20220607; CN 106661701 A 20170510; CN 106661701 B 20180904; EP 3164518 A2 20170510; EP 3164518 B1 20200408; EP 3663416 A1 20200610; EP 3663416 B1 20230405; ES 2785553 T3 20201007; ES 2949421 T3 20230928; FI 3663416 T3 20230508; HU E049802 T2 20201028; HU E061889 T2 20230828; JP 2017524819 A 20170831; JP 2020050956 A 20200402; JP 6612273 B2 20191127; JP 6804617 B2 20201223; KR 102459261 B1 20221025; KR 20170026394 A 20170308; MA 40195 B1 20200630; MA 49777 A 20200610; MA 49777 B1 20230428; MX 2017000201 A 20170803; PL 3164518 T3 20200921; PL 3663416 T3 20230515; RU 2016151759 A 20180628; RU 2016151759 A3 20181204; RU 2689573 C2 20190528; UA 118791 C2 20190311; US 11555226 B2 20230117; US 2017137907 A1 20170518; US 2022298598 A1 20220922; WO 2016001893 A2 20160107; WO 2016001893 A3 20160317; ZA 201608452 B 20191030

DOCDB simple family (application)  
**IB 2014002296 W 20140703**; BR 112016030065 A 20150703; CA 2954145 A 20150703; CN 201580035683 A 20150703; EP 15750810 A 20150703; EP 19218252 A 20150703; ES 15750810 T 20150703; ES 19218252 T 20150703; FI 19218252 T 20150703; HU E15750810 A 20150703; HU E19218252 A 20150703; IB 2015055037 W 20150703; JP 2016575863 A 20150703; JP 2019195914 A 20191029; KR 20167036692 A 20150703; MA 40195 A 20150703; MA 49777 A 20150703; MX 2017000201 A 20150703; PL 15750810 T 20150703; PL 19218252 T 20150703; RU 2016151759 A 20150703; UA A201613238 A 20150703; US 201515322712 A 20150703; US 202217835347 A 20220608; ZA 201608452 A 20161207